

**FIVE-YEAR REVIEW REPORT**  
**AUSTIN AVENUE RADIATION**  
**SUPERFUND SITE**  
**DELAWARE COUNTY, PENNSYLVANIA**

**EPA CERCLIS ID Number PAD987341716**

**Prepared by:**

**U.S. Environmental Protection Agency**

**Region III**

**Philadelphia, Pennsylvania**

**U.S. Environmental Protection Agency Region III  
Hazardous Site Cleanup Division  
Five-Year Review  
Austin Avenue Radiation Site  
Delaware County, Pennsylvania**

**I. Introduction**

**A. Purpose**

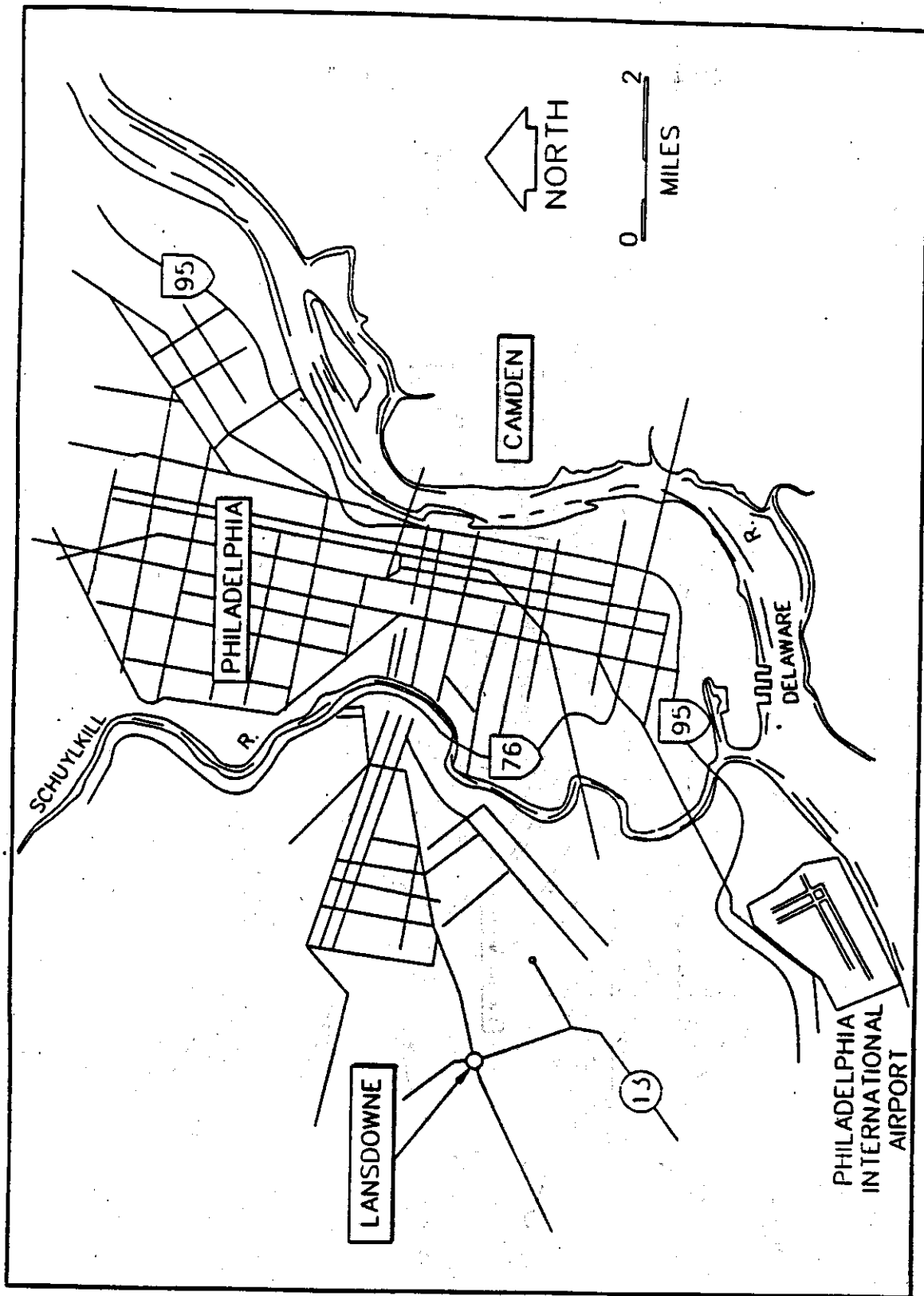
EPA Region III conducted this review pursuant to § 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. § 9621(c); § 300.400(f)(4)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300 (as amended); and OSWER Directives 9355.7-02 (May 23, 1991), 9355.7-02A (July 26, 1994) and 9355.7-03A (December 21, 1995). It is a statutory review. The purpose of a five-year review is to ensure that a remedial action remains protective of public health and the environment and is functioning as designed. This document will become a part of the Site file. This is Type I review since remedial action construction has been completed and the site

**B. Site History and Characteristics**

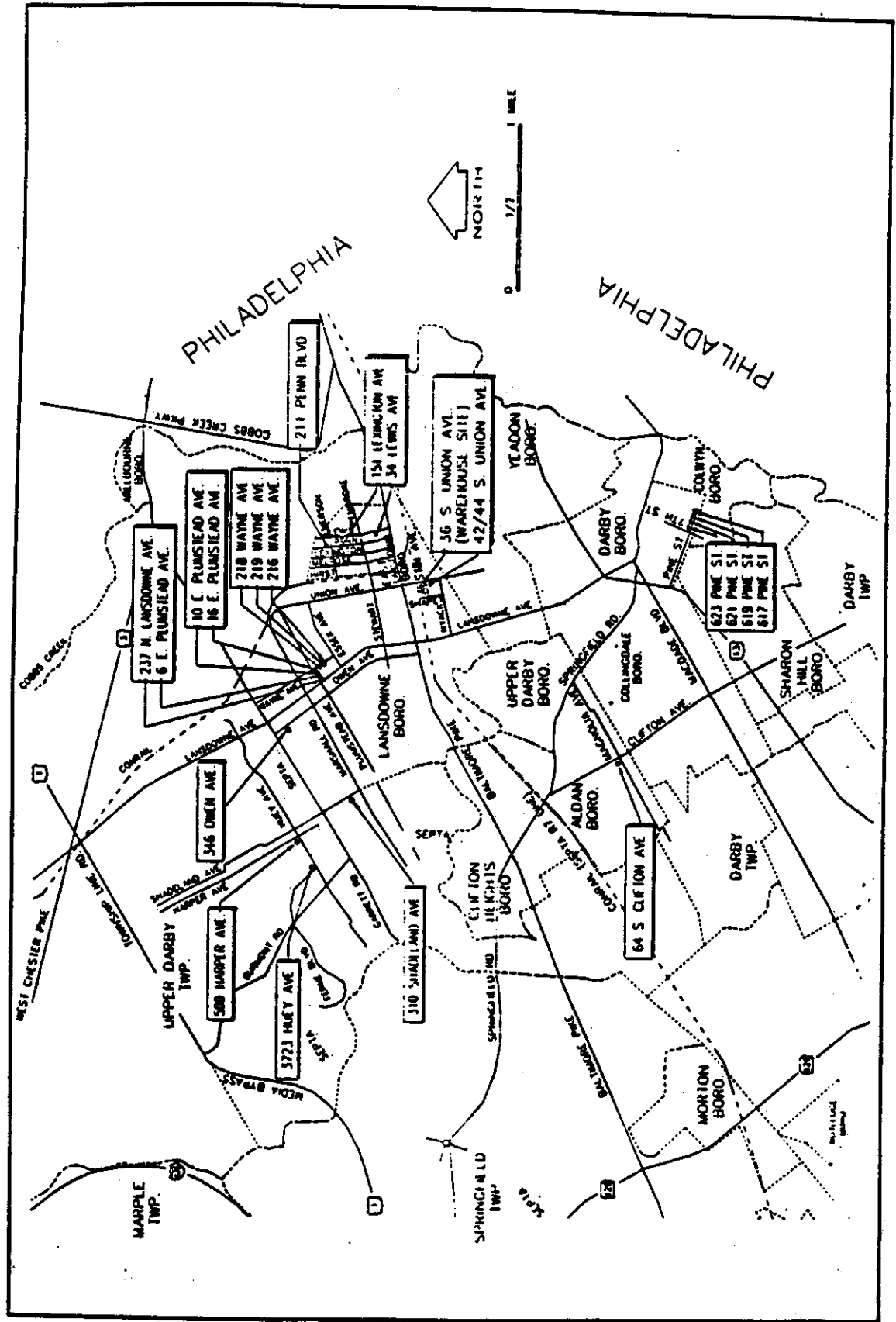
Introduction:

The Austin Avenue Radiation Superfund Site (Site) is located on and near thirty-seven property parcels in: Lansdowne Borough, Aldan Borough, East Lansdowne Borough, Darby Borough, and Upper Darby Township, Delaware County, Pennsylvania. These parcels are all within a two-mile radius of the former W. L. Cummings (Cummings) radium refining operation, which was located at the intersection of Austin and South Union Avenues in Lansdowne, PA (Figure 1). The area immediately surrounding the Site is a mixture of light industrial and residential areas. The combined 1990 population for the five municipalities that the Site encompasses was 110,729 people. The properties associated with the Site were radiologically contaminated with radium (Ra226) and thorium (Th230) contaminated tailings generated by Cummings' radium refining process which was in operation during the early 1900's. A professor from the University of Pennsylvania, developed a crystallization process for refining radium at this facility and also set up his own business in his home basement at 105 E. Stratford Avenue, Lansdowne, PA.

In the late 1910's and early 1920's masonry and building contractors used the sand-like tailings from the Cummings plant as aggregate for the following work activities: laying mortar between brick and stone masonry, pointing mortar on stone or brick masonry, applying stucco on building exteriors, applying plaster to building interiors, and laying concrete for sidewalks and basement slabs. The tailings were also used as fill under basement slabs, exterior perimeter foundation walls and other miscellaneous applications.



**FIGURE 1 Map of Philadelphia Area Showing Location of Lansdowne**



Map 2 Locations of the Twenty-One Properties Comprised by the Austin Avenue Radiation Site

In 1963 the Pennsylvania Department of Health inspected the professor's house at 105 East Stratford Ave. Lansdowne, PA, and found high levels of radiation. In 1964 the U.S. Public Health Service and the Pennsylvania Department of Health, aided by the U.S. Air Force, attempted to decontaminate the house. In 1984, sampling and monitoring of the house by EPA and the PADER, (now the Pennsylvania Department of Environmental Protection (PADEP)), showed high residual radiation contamination levels. An extensive evaluation of the house was conducted by the U.S. Department of Energy's Argonne National Laboratory (ANL). In 1986, the EPA issued a Record of Decision (ROD) outlining a cleanup action for the Stratford Avenue Site. The ROD called for the dismantlement and proper offsite disposal of the house and associated contaminated soils. In 1986, the location of the contaminated tailings became an issue as the government suspected that the tailings would contain residual radiation contamination but there were no records relating to the ultimate disposition of the tailings.

In May 1991 the PADER, visited the former Cummings' property to monitor for radon. Radioactive contamination had previously been discovered in the back yard of 133 Austin Avenue, a property adjacent to the warehouse property. During this visit, radiation instruments further indicated the presence of significant levels of radioactive contamination at the site.

On June 7, 1991, PADER notified the EPA of its findings and requested assistance from the EPA. A joint PADER/EPA site assessment confirmed the presence of radiological contamination at 133 Austin Avenue at levels that warranted immediate action.

On June 19, 1991, a team of radiation specialists from the EPA's National Air and Radiation Environmental Laboratory (NAREL), Montgomery, Alabama, conducted an assessment using special radiation detecting equipment. The warehouse and the adjacent residential dwelling, 133 Austin Avenue, were found to be heavily contaminated with radioactive materials. In November and December of 1991, the EPA used a specially equipped radiation detection van and conducted a 12.5 square mile survey in Delaware County and a small portion of the adjacent City of Philadelphia. The EPA also conducted radiological surveys of the contaminated properties found during the survey. The testing indicated thirty-seven properties within a two-mile radius of the site of the former Cummings radium processing facility were contaminated with Radium 226 (Ra226) and Thorium 230 (Th230).

NPL Listing:

On February 7, 1992, EPA proposed the Austin Avenue Radiation Site to the National Priorities List (NPL) (57FR4824) and finalized its NPL listing on October 14, 1992 (57FR47180).

Removal Actions:

The EPA conducted CERCLA Removal Actions pursuant to Section 104 of CERCLA, 42 U.S.C. §9604 at seventeen of the contaminated properties from 1991 through 1995 at a total cost of approximately \$22 million. The removal actions included temporary relocation of residents of several contaminated properties, the complete dismantlement of the warehouse

structure at South Union and Austin Avenues, dismantlement of the house at 133 Austin Avenue, excavation of contaminated soil removals at a number of properties and removal of plaster, stucco, concrete and soils at selected properties. The removal actions resulted in the complete cleanup of 19 of the identified properties. The temporarily relocated residents of those properties returned to their homes following the completion of the removal action on their property.

Proposed Remedial Action Plans:

On July 1, 1993, the EPA issued a Proposed Remedial Action Plan (PRAP) describing five possible remedial action alternatives for twenty-two property parcels (Figure 2) associated with operable unit one (OU1). The PRAP also designated EPA's preferred alternative for each of the properties. The EPA opened a public comment period and requested comments on the PRAP. In response, EPA received numerous letters from citizens and public officials requesting the EPA reconsider its preferred alternative for several of the parcels. Based on these comments, EPA gathered additional information to develop and evaluate other remedial alternatives for the properties. On March 2, 1994, following consideration of the responses to the first PRAP, EPA issued a revised PRAP encompassing twenty-two parcels.

On July 7, 1996, the EPA issued a PRAP describing the no action alternative for site related groundwater, operable unit two (OU2). The comment period was held from July 7, 1996 through September 5, 1996, and a public meeting was held on July 31, 1996. On September 27, 1996, EPA Region III issued a 'No Remedial Action' ROD for site related groundwater. The No Action was based on the fact that EPA's investigation of groundwater revealed no risks to human health or welfare or the environment.

ROD and Remedial Action OU1:

On June 27, 1994, EPA Region III, issued a Record of Decision (ROD) selecting a remedial action for the site related properties. The ROD contained an estimated cost for the cleanup ranging from \$36,642,250 to \$38,581,200. The selected cleanup had the following major elements:

1. The removal of the contaminated components from the residential structure located at 346 Owen Avenue, Upper Darby, Pennsylvania and the repair of the structure.
2. The removal of the contaminated structural components where practicable, or the complete dismantlement of residential structures on eighteen properties followed by either repair of the structures, replacement of the structures on those properties, or permanent relocation of the residents to an offsite location. The property owners would select (where practicable) structure replacement, or offsite relocation after the issuance of the ROD. The United States would acquire title to each property where the residents had selected offsite relocation. At the end of the remedial action, title to each such property would be transferred to the Commonwealth of Pennsylvania.
3. The dismantlement, and reconstruction of a building addition at the 42 South Union Avenue property, and the repair and reconstruction of a portion of the adjoining structure

at 44 South Union Avenue.

4. The temporary relocation of property residents during contamination removal and structural restoration / replacement.
5. Removal and offsite disposal of radiation-contaminated soils to permitted facilities.
6. Offsite disposal of radioactive and demolition wastes to permitted facilities.
7. Backfilling and re-vegetation of remediated properties.
8. Replacement of a storage building that at one time was 135 Austin Avenue.
9. Provision of an offsite structure or equivalent to replace the building formerly located at 133 Austin Avenue. (The remedial action at this property is limited permanent offsite relocation . This property was cleaned of radioactive materials by EPA as part of a Removal Action conducted at the Site. A three story house had occupied the lot prior to EPA's Removal Action. That house was completely dismantled and disposed of as part of the cleanup of the property.)
10. Provision of institutional controls in those instances where soils cannot be removed to a level where the property is available for unrestricted use and unlimited access.

**Remedial Construction Activities:**

The remedial action, including residential relocations, remedial design and construction were Federally funded actions performed through Interagency Agreements (IAGs) between EPA and the U.S. Army Corps of Engineers (USACE). On September 21, 1994, the EPA and the Commonwealth of Pennsylvania entered into a Superfund State Contract for the remedial action at the site.

The ROD specified affected homeowners would be given an option between permanent offsite relocation in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA) (42 U.S.C. Chapter 61), or permanently relocation back on-site to a newly reconstructed residence. The newly constructed home would be constructed with modern methods and materials and would maintain the same "curbside appeal" of the previous structure. The newly constructed house would also meet modern building and local codes, and the decent safe and sanitary standards of the URA and the homeowners would participate in the design process of their new homes. A summary of the remedial action selected for each property is contained in Table 1.

**Table 1: Property Parcels and Remedial Action Selected**

<b><u>Lansdowne Borough:</u></b>	
(1)	216 Wayne Avenue; Rebuild Selected
(2)	218 Wayne Avenue; Rebuild Selected
(3)	219 Wayne Avenue; Rebuild Selected
(4)	237 North Lansdowne Avenue; Rebuild Selected
(5)	6 East Plumstead Avenue; Rebuild Selected
(6)	10 East Plumstead Avenue; Rebuild Selected
(7)	16 East Plumstead Avenue; Rebuild Selected
(8)	42/44 South Union Avenue; Rebuild Performed
(9)	133 Austin Avenue; Permanent Relocation Performed
(10)	36 S. Union Ave Former Cummings Facility Property (Warehouse Property), (Soils excavated only, structure not rebuilt) <i>Note: This structure was structurally deficient for reason unrelated to the contamination, and was in danger of collapse)</i>
<b><u>Upper Darby Township:</u></b>	
(11)	500 Harper Avenue; Permanent Relocation Selected
(12)	346 Owen Avenue; Partial Rebuild Performed
(13)	310 Shadeland Avenue; Rebuild Selected
(14)	3723 Huey Avenue; Permanent Relocation Selected
<b><u>Aldan Borough:</u></b>	
(15)	64 South Clifton Avenue; Rebuild Selected
<b><u>East Lansdowne Borough:</u></b>	
(16)	34 Lewis Avenue; Permanent Relocation Selected
(17)	211 Penn Boulevard; Rebuild Selected
(18)	151 Lexington Avenue; Permanent Relocation Selected
<b><u>Darby Borough:</u></b>	
(19)	617 Pine Street; Permanent Relocation Selected
(20)	619 Pine Street; Permanent Relocation Selected
(21)	621 Pine Street; Permanent Relocation Selected
(22)	623 Pine Street; Permanent Relocation Selected

**Real Estate Activities:**

The USACE Real Estate Division performed property acquisitions, and residential relocations for the affected homeowners and tenants in accordance with the URA. Permanent relocations and title acquisitions were performed for the following properties: Darby Borough- 617 Pine Street, 619 Pine Street, 621 Pine Street, and 623 Pine Street; East Lansdowne Borough- 151 Lexington Avenue, 34 Lewis Avenue; Lansdowne Borough- 133 Austin Avenue; Upper



Darby Township- 3723 Huey Avenue and 500 Harper Avenue. The USACE also permanently relocated tenants from the rental properties located at 216 Wayne Avenue Lansdowne Borough and 310 Shadeland Avenue Upper Darby Township, and 44 S. Union Avenue.

### On-Site Construction

The remedial action IAG with the USACE was initiated on December 30, 1994 and on July 28, 1995, the USACE Baltimore District awarded a contract for the remedial action and construction to Severson Environmental Services for \$13,685,414. The on site construction began on October 25, 1995 (*this becomes the trigger date for the first Five-Year Review*). The physical construction of the remedy, in accordance with the approved remedial design and design specifications, was completed in November 1997. The site's Preliminary Close Out Report (PCOR) was signed on September 27, 1999, and the Site's Remedial Action report was signed on June 15, 2000.

## **II. Remedial Objectives; Areas of Compliance/Non-compliance**

The five year review started on May 9, 2000 and consisted of a file review and an site visits in June and August 2000. The most recent EPA site-wide visit occurred on October 11, 2000 with the U.S. Army Corps of Engineers.

The remedial activities at the site included the following; 1) removal and proper disposal of radiologically contaminated material (RCM) in soils and structural materials from the houses, 2) removal and proper disposal of asbestos containing materials (ACM) from the houses, 3) demolition, removal and proper disposal of the non-contaminated portions of the residential structure, 4) consolidation, packaging and shipment of RCM soil and debris to Envirocare, Clive Utah for disposal and the packaging and shipment of ACM for proper disposal, 5) consolidation, packaging and shipment of non RCM to a local landfill for disposal, 6) independent post cleanup verification study for each property performed by Argonne National Laboratory (ANL), 7) reconstruction of the residential dwelling to the remedial design plans and specifications, 8) temporary and permanent residential relocations in accordance with the URA, and 9) excavation and proper disposal of the radiologically contaminated soils from the warehouse property.

The warehouse property is a non residential property approximately 120 ft by 110 ft in area, and is located at the corner of Union and Austin Avenues. The warehouse property was formerly occupied by the Cummings processing facility. The property is bordered to the East and South by S. Union and Austin Avenues respectively. The property is bordered on the North by the SEPTA regional rail tracks. Soil contamination at this property was not uniformly distributed, and extended to a depth of approximately 25 feet at the SE corner of the lot. Soil excavation was necessary to depths of up to 18 feet adjacent to the railroad tracks.

## **A. Cleanup Goals:**

The cleanup goals were:

- 1) All soils in residential and potentially residential settings having site-related Ra226 contaminant concentrations in excess of 5.0 picocuries/gram (pCi/g) (in individual soil samples, including background activity concentration) were removed.
- 2) For properties that EPA determined were unlikely to become residential (i.e. the lot at the 133 Austin Ave location is too narrow to allow rebuilding under current Lansdowne Borough ordinances.) streets, parks, railroad right-of-way, etc. had soils removed to the 5 pCi/g level if those soils had Ra226 contamination exceeding 5pCi/g above background in the top 15 cm (centimeters) and/or 15 pCi/g above background in soils below 15 cm averaged over 100 square meters.
- 3) Institutional controls to restrict the future construction of residential dwellings and/or the depth of building footings and foundations will be implemented if EPA is unable to reduce contamination to the 5 pCi/g level at these non-residential properties.

Other material/debris on the property that exceeded the above limits were also considered radioactive waste and disposed of properly.

The cleanup criteria for residential properties was met for all the residential properties associated with the site. On the non-residential property, site related radiological contamination extended beyond the property line of the warehouse property at 36 S. Union Avenue on the southern side to Austin Avenue and beyond the property line on the eastern side into South Union Avenue. These areas were unlikely to become residential (roadways, sidewalks), and fell under the criterion of 15 pCi/g below 15 cm, averaged over 100 square meters. The results of ANL's verification survey at the warehouse property following the remedial action indicated the average Ra226 concentration was 1.6 pCi/g, which was well below the cleanup concentration of 5 pCi/g for Ra226.

## **B. ARARs**

As part of the five year review, a review of the applicable or relevant and appropriate requirements (ARARs) was conducted to determine if any ARARs associated with the remedial action had changed since the issuance of the ROD, and if they had, whether the remedial action would still be protective of human health and the environment. Only those ARARs addressing the risk posed to human health or the environment were reviewed for they related to the protectiveness of the remedy. Other ARARs, that were not based on the risk posed to human health or the environment, were not reviewed. The following ARARs, apply to the five year review criteria:

Major Federal ARARs: OUI

40 CFR Part 192, Subpart B (Standards for Cleanup of Land and Buildings Contaminated with Residual materials from Inactive Uranium Processing Sites)

Major Commonwealth of PA ARARs OUI:

There were no Commonwealth of PA ARARs identified at the time of the issuance of the 1994 ROD that were relevant and appropriate to the remedial actions. After the issuance of the ROD, the Commonwealth of Pennsylvania, Department of Environmental Protection issued the Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act II of 1995).

There have not been changes in the Federal laws and regulations that were used in the remedy decision process, nor have there been new laws and regulations promulgated since the signing of the ROD that are applicable or relevant and appropriate. EPA has determined that PADEP's Act II does not impose any requirements that are more stringent than the Federal standards.

The ARAR, Standards for Cleanup of Land and Buildings Contaminated with Residual Materials from Inactive Uranium Processing Sites, 40 CFR Part 192 Subpart B, is an ARAR that was relevant and appropriate to the action. All properties were cleaned up to the performance standards indicated by this ARAR.

ARARs OU2 (Groundwater):

The 1996 ROD determined no remedial action was necessary to ensure protection of human health and the environment. There are no hazardous substances or pollutants or contaminants present at this OU at concentrations that would prevent unlimited use and unrestricted exposure of the groundwater. The following ARARs were reviewed for changes that could affect the protectiveness of the remedy:

(1) Safe Drinking Water Act (SDWA) (40 CFR Parts 141-146);

(2) Commonwealth of Pennsylvania, Department of Environmental Protection: Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act II of 1995).

The SDWA was reviewed during the five year review to determine if there were any revisions to the Maximum Contaminant Levels (MCLs). MCLs are the maximum concentrations of drinking water contaminants permissible in public water supplies under Section 1412 of the Federal Safe Drinking Water Act, 42 U.S.C. §300g-1, and the federal regulations at 40 C.F.R. Part 141, Subpart B for any Site-related radionuclides. There has not been a revision to site related MCLs since the issuance of the ROD.

**Table 2: Site related contaminants and their respective MCL:**

Contaminant	MCL (year)	Highest Concentration (Filtered Samples)
Uranium	30 pCi/l (1996- <i>proposed</i> ) 30 pCi/l (2000- <i>final</i> )	9.1 pCi/l
Radium 226/228†	5 pCi/l (1996) 5 pCi/l (2000)	1.3 pCi/l
Alpha Emitters†† (total)	15 pCi/l (1996) 15 pCi/l (2000)	<15 pCi/l (Total)

†Note: The MCL is combined Ra226 and Ra228. Ra228 is much more rare than Ra226, and although not analyzed for specifically, would, in any event, contribute insignificantly to the total radium concentration.

†† Note: At the time of the 1996 ROD there was no standard for Thorium230, the same is true at the time of this five year review. However, the MCL for alpha emitters (which includes Th230), excluding radon and uranium is 15 pCi/l. No filtered or unfiltered groundwater samples exceeded this concentration limit for thorium230

In 1996, EPA did not consider that the Commonwealth of Pennsylvania, Department of Environmental Protection Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act II of 1995) as an ARAR. EPA determined that Act II did not, under the circumstances at the Site, impose any requirements that were more stringent than the federal standards.

The MCLs for the contaminants of concern have not changed from the issuance date of the ROD and thus they have not become more stringent. PADEP's Act II requires Commonwealth of Pennsylvania groundwater cleanup standards to be consistent (not more stringent) than the Federal requirements (MCLs). EPA has determined that Act II does not impose any requirements that are more stringent than the federal standards. Based on current ARAR analysis, the no remedial action selected in the ROD for groundwater is still protective of human health for it does not pose an unacceptable risk for site related contaminant.

### **C. Institutional Controls**

The ROD for OU1 includes a provision for institutional controls for instances where soils could not be removed to a level where the property is available for unrestricted use and unlimited access. The Site's September 27, 1999 Preliminary Closeout Report (PCOR) indicated the possible need for deed restrictions on the 133 Austin Avenue property and the warehouse property immediately adjacent to the railroad tracks. During the time period since the PCOR,

the Region and USACE considered this issue. After reviewing existing site data, in consultation with Region III's radiation expert, the Region determined ICs were not necessary at these properties. These properties are discussed below.

**133 Austin Ave Property:**

EPA Region III analyzed a hot-spot at the 133 Austin Avenue property, and determined there is no significant danger to health from this small amount of contamination located on this property. Based on the location of the contamination, it appears to result from an old cesspool that was located in the back yard the properties at 133 and the former 135 Austin Avenue. The cesspool was located on the border between the two properties, and was found to have been filled in with tailings from the radium refining operation. It is located nine feet down in a position next to the railroad tracks where any future digging is very unlikely. Even if this material were to be dug up, the hazard from the radioactivity is minimal. As such, no deed notice or restriction will be pursued for this property for its radioactive contribution is insignificant.

**Warehouse property / SEPTA railroad Right-of-Way**

The soils contained within the limits of excavation at the warehouse property were cleaned up to the standards described previously in this report. ANL took additional measurements outside the limits of excavation by inserting tubes horizontally into the sidewall of the excavation. ANL was able to compute an estimated Ra226 concentration in soil from gamma readings taken along the northern excavation wall.

A series of hot-spots, (Ra226 concentration at or exceeding 15 pCi/g), was located during the ANL study at a depth of approximately three feet and extending eight feet from the face of the excavation and into the SEPTA right-of-way. The hot-spots have an average estimated Ra-226 concentration of approximately 50pCi/g and is contained within a 2.6 square meter area. Since this is a non-residential property and unlikely to become residential, the activity concentration is averaged over 100 square meters as set forth in clean up standard. The hot-spot contributes an estimated 1.28 pCi/g Ra226 concentration when averaged over the 100 square meters. When this is accounted for in relation to the remaining portion of the warehouse property, having a average value of 1.6 pCi/g, it does not contribute significantly, and the entire property is still within the cleanup criteria.

Construction setback limitations and the SEPTA right-of-way administrative controls, place limitations on future excavation and construction activities involving soils immediately adjacent to the property line and within the right-of-way. As such, additional institutional controls are not necessary in regard to this property.

**4. Observations**

All reconstructed properties have been return to their respective owners. The upkeep of the properties are the responsibility of their respective owners or title holders. All rebuilt and non rebuilt properties look well maintained.

## **5. Community Involvement**

At various occasions during the time period immediately following the completion of the remedial action through June 2000, complaints from the community regarding lawn care and snow removal on the non-rebuilt properties were raised to EPA. Through an Interagency Agreement with the USACE, EPA has addressed these issues. The USACE had a property maintenance contract with a local contractor for lawn maintenance, and snow removal on the non rebuilt properties. This contract has expired for all the non rebuilt properties except for the 133 Austin Avenue property. The maintenance contract on the 133 Austin Ave property will expire when the United States successfully transfers its title to the Commonwealth of Pennsylvania.

A number of local municipalities showed interest in direct title transfer of the non-rebuilt properties. The EPA and the Commonwealth of PA worked with the local municipalities to resolve the issue of direct transfer. On September 28, 2000 the USACE sent three fully executed deeds to Upper Darby, Darby, and East Lansdowne Boroughs for recording in the land records. The title for the 133 Austin Avenue property will be transferred to the Commonwealth of PA in 2001.

## **III. Recommendations.**

No further response actions are determined to be necessary based on this five-year review.

## **IV. Statement on Protectiveness**

### **OU 1**

The remedy for OU1 is protective of human health and the environment. All structures and soils in residential areas were cleaned up standards that are suitable for unrestricted use. All soils in nonresidential areas and areas unlikely to become residential were cleaned up to standards deemed protective of human health and the environment. The small portion of subsurface radiologically contaminated soils inside the SEPTA right of way, falls within the cleanup standard for the site. The SEPTA right of way and set-backs dictated by building codes act as institutional controls restricting or limiting access or disturbance to these soils.


### **OU 2**

The remedy for OU2 is protective of human health and the environment. The ROD called for no remedial action. EPA still believes that no remedial action is necessary.

I certify that the remedy for the site remains protective of human health and the environment.

**V. Next Five-Year Review.**

The next five-year review will be conducted no later than December 8, 2005.

  
Abraham Ferdas, Director  
Hazardous Site Cleanup Division

12/21/00  
Date